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IN THE DRAWINGS:

Please cancel Fig. 4 (Figs 4a-4i).

REMARKS

This paper is responsive to an Office Action mailed June 29, 2007. Prior to this response, claims 1-21, 23, and 25-44 were pending. After amending claims 1-2, 10-11, 19-21, 23, 25, 28, 32, 35, and 39, claims 1-21, 23, and 25-44 remain pending.

In Section 2 of the Office Action claims 1-21, 23, and 25-44 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Office Action also states that claims 1-21, 23, and 25-44 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

With respect to claim 1, the Office Action states that it is logically inconsistent to recite "a series of 2-shot laser irradiation steps, where each series includes...N number of steps in an orthogonal directions". The Applicant has amended claim 1 to almost exactly match the language in the specification at page 6, lines 13-17. Claim 2 has been amended to be consistent with claim 1. These amendments should address any concerns regarding new matter.

With respect to claim 2, the Applicant respectfully submits that the Examiner is giving the word "step" a meaning that is more properly associated with the word "shot". The industry standard usage of the term "2-shot" is intended to generally describe a process that laser anneals a relatively large substrate area through a series of small steps. Enclosed is a paper co-authored by the inventors, which described the 2-shot process (see page 2, beginning at line 6 of the right column). The "N" is (i.e., 2N-shot) to add the element of orthogonality to the 2-shot process.

The Applicant has added language to claim 1 to recite that N is greater than one, to distinguish an orthogonal 2N-shot process from a 2-shot process ($N = 1$).

Page 6 of the specification, at lines 13-17, states:

"In the 2N-shot method, an amorphous silicon (a-Si) film is exposed to a series of 2-shot laser irradiation steps with 'N' equal to the number of steps. For each step, the substrate (or beamlets) is rotated 90° with respect to the direction of lateral growth of the previous step."

The specification does not state that a step must be composed of a single shot. In the simplest possible interpretation of the process, which appears to corresponding to the Examiner's understanding, $N = 2$ and each step consists of a single shot. The Applicant agrees that this is one possible interpretation of the language, but not the only. Practically, the first 2-shot step ($N=1$) may include a plurality of laser shots directed towards a substrate moving in a first direction. In the second 2-shot step ($N=2$), the substrate is turned 90 degrees and a plurality of laser shots may be directed towards the substrate, now moving in a direction perpendicular to the first direction.

Claims 2 and 11 has been amended to clarify the recitation of the apertures. Claim 2 has been amended to recite first and second apertures, so that the first and second apertures are identified with annealing the first area (the 2N-shot process). Claim 11 has been amended so that the third aperture is identified with the second area (the DS process). Claims 19-21 have been amended to accord with the changes made to claims 2 and 11.

With respect to claim 25, 28, 35, and 39, the claims have been amended as suggested in the Office Action.

Fig. 4 has been canceled and references to Fig. 4 have been deleted from the specification.

In Section 5 of the Office Action, claims 1-10 has been rejected under 35 U.S.C. 103(a) as unpatentable with respect to Sposili et al. ("Sposili"; US 6,577, 380), citing Sections 24 and 7 of the Office Action mailed on 9/19/2006 and 3/1/2007. The Office Action states that the rejection might be removed if the claims required that N be greater than 1. As noted above, claim 1 has been amended to recite that N be greater 1, and the Applicant respectfully requests that the rejection be withdrawn.

The Office Action has rejected claims 11-21, 23, and 25-44 under 35 U.S.C. 103(a) as unpatentable with respect to Sposili in view of Yamazaki, and Fukunaga or Kawasaki. The Office Action acknowledges that Sposili does not disclose the use of a third aperture pattern. The Office Action states that it would have been obvious to employ sequential annealing techniques as taught by Sposili, for any laser annealing technique presented in the combination of Yamazaki plus Fukunaga or Kawasaki. This rejection is traversed as follows.

An invention is unpatentable if the differences between it and the prior art would have been obvious at the time of the invention. As

stated in MPEP § 2143, there are three requirements to establish a *prima facie* case of obviousness.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck* 947 F.2d 488, 20 USPQ2d, 1438 (Fed. Cir. 1991).

In the Abstract, Sposili discloses a material processing system that may employ a SLS process. At col. 1, ln. 20-25, Sposili discloses an optical material processing system. At col. 2, ln. 1-40, Sposili states that, "SLS requires that with each irradiation the silicon film be completely melted in and only in a micron-sized spatially controlled region or regions, and that the film be translated with sub-micron precision in between irradiations such that the lateral crystallization induced by each irradiation overlaps with that produced previously." The Applicant notes that Sposili does not disclose *orthogonal* film transitions, as is required in the claimed 2N-shot process.

At col. 3, ln. 46 through col. 4, ln. 5, and col. 5, ln. 8-25 & 25-66, Sposili discloses an optical system that is able to deliver localized intense heat. The cited section also discloses a large-travel translation system, a self-luminous light beam, and an energy recycling exposure system. The cited section claims an increased lateral growth length and reduced number of defects as a benefit of adjusting pulse duration.

At col. 6, ln 15-60, Sposili discloses an XeCl laser. At col. 7, ln. 11-22, Sposili discloses a self-luminous beam and mask. At col. 9, ln. 34-60, Sposili discloses a system that uses a beam 11 and mask 8 to perform the SLS process. "In addition to the delivery of the beam energy at sufficient fluence in the patterns and at the locations defined by the mask, an important element of the system is the ability to translate the substrate (and/or the mask) in a specific schedule of scanning and stepping precisely coordinated with the laser pulses. The details of the translation schedule are specific to the particular process being conducted and will not be elaborated upon here."

As acknowledged in Section 5 of the instant Office Action, Sposili does not disclose a 2N-shot process where N is greater than 1,

Section 22 of the Office Action of 9/19/2006 states that Yamazaki discloses the annealing of a Si film that has been covered with an oxide and exposed to a catalytic agent. The Office Action states that Yamazaki forms monodomain regions, and the use of lasers and heating lamps. However, the Office Action makes no assertion that Yamazaki discloses a process based upon laser annealing a Si film in orthogonal directions, such as the recited 2N-shot process.

Section 21 of the Office Action of 9/19/2006 states that Fukunaga discloses an annealing process that uses several laser shots and a nickel catalyst to crystallize a Si film. The Office Action also states that Fukunaga discloses the use of infrared lamps. However, the Office Action makes no assertion that Fukunaga discloses a process based upon laser annealing a Si film in orthogonal directions, such as the recited 2N-shot process.

Section 22 of the Office Action of 9/19/2006 states that Kawasaki discloses lateral growth crystallization using thermal and laser processes and catalytic agents. However, the Office Action does not assert that Fukunaga discloses a process based upon laser annealing a Si film in orthogonal directions, such as the recited 2N-shot process.

The Yamazaki/Fukunaga/Kawasaki references have been combined with Sposili based upon the assumption that Sposili makes obvious all the limitations recited in Applicant's claim 1. However as discussed above, Sposili does not disclose a 2N-shot process ($N > 1$) that includes orthogonal steps, as recited in claim 1. Neither do Yamazaki, Fukunaga, or Kawasaki disclose such a limitation. Further, none of the above-mentioned references disclose the combination of a 2N-shot process followed by a DS process, as recited in claim 1. With respect to the third *prima facie* requirement, even if elements from Yamazaki/Fukunaga/Kawasaki are combined with Sposili, that combination does not explicitly disclose the 2N-shot process or the combination of the 2N-shot and DS processes recited in claim 1. Claims 11-21, 23, and 25-44, dependent from claim 1, enjoy the same advantages.

With respect to the first *prima facie* requirement, the Office Action states that it would have been obvious to employ sequential annealing techniques as taught by Sposili, for any laser annealing technique presented in the combination of Yamazaki plus Fukunaga or Kawasaki. However, even if this statement were correct, it does not explain how or why an expert in the art could have modified Sposili in such a way as to describe the claimed invention.

As noted in MPEP 2142:

The legal concept of *prima facie* obviousness is a procedural tool of examination which applies broadly to all arts. It allocates who has the burden of going forward with production of evidence in each step of the examination process. See *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Saunders*, 444 F.2d 599, 170 USPQ 213 (CCPA 1971); *In re Tiffin*, 443 F.2d 394, 170 USPQ 88 (CCPA 1971), *amended*, 448 F.2d 791, 171 USPQ 294 (CCPA 1971); *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

A *prima facie* analysis is especially critical in the present circumstances since the rejection is predicated on limitations that are not explicitly disclosed in the prior art references. As noted in addressing the third *prima facie* requirement, even when combined, Sposili, Yamazaki, Fukunaga, and Kawasaki all fail to disclose the orthogonal steps limitation of the claimed invention. Neither do the references disclose a method that uses a combination of 2N-shot and DS processes. Therefore, the claim invention can only be obvious if an artisan makes substantial modifications to the Sposili reference. More particularly, the Yamazaki/Fukunaga/Kawasaki references must suggest a modification to Sposili adds orthogonal 2-shot steps. The Yamazaki/Fukunaga/Kawasaki references must simultaneously suggest a modification to Sposili to perform a separate DS process following a 2N-shot process.

To support a *prima facie* case of obviousness based upon the modification of Sposili, the Office Action must show the logic or thought process that an artisan might employ to change Sposili's device into one that incorporates all the Applicant's limitations. The Applicant

respectfully submits that there is no language in the Yamazaki/Fukunaga/Kawasaki references that provides this guidance.

As another alternative, the *prima facie* case of obviousness based upon the modification of Sposili may be supported using the knowledge of a person with skill in the art, to supply the motivation lacking in the Sposili/Yamazaki/Fukunaga/Kawasaki references. However, in this case it would especially critical to supply evidence of the kind of knowledge that an artisan is assumed to have. Notable, when the source or motivation is not from the prior art references, "the evidence" of motive will likely consist of an explanation or a well-known principle or problem-solving strategy to be applied". *DyStar*, 464 F.3d at 1366, 80 USPQ2d at 1649. The Office Action has not supplied any explanation of how an artisan could possibly modify any of the references to yield all the explicit limitations recited in the base claim.

Considered from the perspective of the second *prima facie* requirement, even if an expert were given the Sposili/Yamazaki/Fukunaga/Kawasaki inventions as a foundation, no evidence has been provided to show that there is a reasonable expectation of success in the claimed invention.

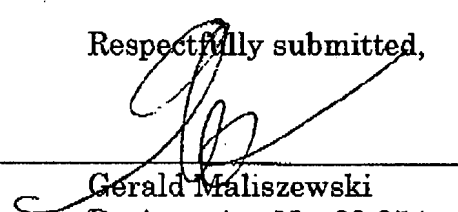
In summary, the Applicant respectfully submits that a *prima facie* case of obvious has not been supported since the combination of references does not explicitly disclose every limitation of claim 1. Neither has a case been supported that Sposili can be modified to supply the missing limitations in view of Yamazaki/Fukunaga/Kawasaki. Finally, a case has not been supported that Sposili can be modified to supply the

missing limitations in view of what was known by a person of skill at the time of the invention. Since a *prima facie* case of obvious has not been supported, and the Applicant requests that the rejection of claims 11-21, 23, and 25-44 be removed.

It is believed that the application is in condition for allowance and reconsideration is earnestly solicited.

Respectfully submitted,

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